Characteristics of vegetation structure in breeding area of Siberian rubythroat (*Luscinia calliope*) in Daecheongbong peak, Mt. Seoraksan national park, South Korea

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Abstract: Most of forest birds have the characteristics for habitat selection. The purpose of this study is to clarify the vegetation structure in breeding area of Siberian rubythroat (*Luscinia calliope*). In Daecheongbong peak, Mt. Seoraksan national park, South Korea from May to August, 2001, breeding population of Siberian rubythroat and the dominant species in breeding area of Siberian rubythroat (*Luscinia calliope*) were surveyed by line transect method along the ridge in the Daecheongbong peak area. Number of individuals and location of song posts were observed and recorded. According to the survey results, the study area was classified into high, middle and low density areas. Those birds selected the forest area of dominant species for Erman's birch and dwarf Siberian pine as habitat and preferred the shrubs area with the lower height and higher coverage.

Keywords: *Luscinia calliope*; Siberian rubythroat, South Korea; Vegetation structure
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Introduction

Since people first started foraging for animals they has realized that each species live in different places and that different birds are found in different habitats (Cody 1985). Birds are extremely mobile and wide ranging, and in the range of habitats they pass through or over, only specific ones are used for breeding or foraging or wintering (Hilden 1965).

The role of habitat selection in bird studies, whether their emphasis is on ecology, behavior, or physiology, is pervasive.

The tautology that each bird is adapted to its particular environment or habitat gains respectability. Species features of habitat are responsible for the physiological differences between related species or that a particular species has evolved a certain foraging behavior in relation to certain structural features of habitat (Cody 1985). Most of forest birds have habitat selection for breeding success and survivals (Newton 1998). For the protection and management of bird species, habitat selection would be especially needed for rare species (Rhim 2002).

Siberian rubythroat (*Luscinia calliope*) distribute in eastern Eurasia (Mullarney *et al.* 1999). They were bred in Mongolia, northern and eastern China, Japan and northern Korea, and wintered southern China, Taiwan, India and Philippines. This species is known as summer visitor in Gaema highland, North Korea and passage migrant in South Korea (Lee *et al.* 2000). Males regularly sing at the song post within their territories from early in the morning to the evening. They make nests in grassland and bushes of coniferous forests (Won 1981).

Recently small breeding populations of Siberian rubythroat were observed in high altitude areas of South Korea. The purpose of this study is to clarify the habitat selection of Siberian rubythroat in Daecheongbong peak area of Mt. Seoraksan national park, South Korea.

Methods

This study was conducted in Daecheongbong peak (38°6' 59" N, 128° 28' 3" E, 1 707 m a.s.l.), Mt. Seoraksan national park, South Korea where is known as breeding area of small population of Siberian rubythroat from May to August 2001.

After being designated as natural monument (No. 171) in Nov. 1965, Mt. Seoraksan became the 5th national park in March 1970, with an area of 373 km^2. The national park was selected as a conservation area, the only one in South Korea, by UNESCO in 1982, because of its variety of plants and animals (Seo *et al.* 2001).

Breeding population of Siberian rubythroat was surveyed by line transect method along the ridge in the Daecheongbong peak area. The song post and number of individuals were observed and recorded. The survey was conducted from 6:00 AM to 9:00 AM (Kendeigh 1944) from May to August 2001.

According to the observational frequency of Siberian rubythroat, we classified the study area into high, middle and low-density areas according to survey results of that

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species. There were more than 10 individuals per hectare in high-density area, 5 to 10 individuals per hectare in middle density area and less than 5 individuals per hectare in low density area. In each density area, 3 quadrates (30 m x 30 m) were set up. The location of song posts, and vegetation structure including the coverage of shrubs and herbs, and the height of shrubs were surveyed within 9 quadrates in August 2001.

Results and discussion

Totally 17 individuals of Siberian rubythroat were observed in the study area. Manchurian fir (*Abies nephrolepis*) was used as song posts of Siberian rubythroat in the study area.

The vegetation structure in breeding area of Siberian rubythroat was shown as Table 1. In the high density area, Erman's birch (*Betula ermanii*), Japanese maple (*Acer palmatum*), royal azalea (*Rhododendron schlippenbachii*) and Korean azalea (*Rhododendron mucronulatum*) were dominant species. Range of shrubs height was from 0.3 m to 1.0 m. Shrubs coverage was more than 98% and herbs coverage less than 2% in high-density area.

Dwarf Siberian pine (*Pinus pumila*), Korean azalea (*Rhododendron mucronulatum*) and Erman's birch (*Betula ermanii*) were dominant species in middle density area. Heights of shrubs were from 0.4 to 1.2 m. Mean shrub coverage was 88%.

Mongolian oak (*Quercus mongolica*), dwarf Siberian pine (*Pinus pumila*), Korean azalea (*Rhododendron mucronulatum*) and red euonymous (*Euonymus oxyphyllus*) were dominant species in low density area. Height of shrubs was from 0.5 m to 2.5 m. Mean shrub coverage was 67%.

Table 1. Vegetation structure in breeding area of Siberian rubythroat in Daecheongbong peak, Mt. Seoraksan national park, South Korea

Site	Dominant species	Height of shrubs /m	Coverage of Shrubs (%)	Coverage of herbs (%)
High density area 1	*Betula ermanii, Acer palmatum, Rhododendron schlippenbachii*	0.4 – 0.8	98	2
High density area 2	*Rhododendron mucronulatum, Rhododendron schlippenbachii, Acer palmatum*	0.4 – 1.0	99	0
High density area 3	*Betula ermanii, Rhododendron schlippenbachii*	0.3 – 0.8	100	0
Middle density area 1	*Pinus pumila, Rhododendron mucronulatum, Betula ermanii*	0.5 – 0.9	95	5
Middle density area 2	*Pinus pumila, Rhododendron mucronulatum, Betula ermanii*	0.5 – 1.0	80	0
Middle density area 3	*Rhododendron mucronulatum, Betula ermanii, Pinus pumila*	0.4 – 1.2	90	0
Low density area 1	*Quercus mongolica, Pinus pumila, Rhododendron mucronulatum*	0.7 – 2.0	70	30
Low density area 2	*Quercus mongolica, Euonymus oxyphyllus, Rhododendron mucronulatum*	1.0 – 2.5	70	30
Low density area 3	*Rhododendron mucronulatum, Quercus mongolica, Pinus pumila*	0.4 – 1.2	90	0

Vegetation structures were different in each density area. Mean height of shrubs was lowest in high-density area and tallest in low density area. There was more coverage of shrubs in high-density area. Siberian rubythorat may prefer the Erman's birch, dwarf Siberian pine and *Rhododendron* spp. in the study area. The dominant areas of those species were frequently selected as habitat of Siberian rubythroat.

In the further studies, it would be needed to study on the specific habitat preferences of Siberian rubythorat in breeding area of South Korea.

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